

REMARKS

Claims 1 to 17 are pending in the application.

Drawings

The drawings are objected to under 37 CFR 1.83(a) for not showing all features of the invention as claimed. The examiner refers to the features of claims 5, 7, 13, and 15 (first and second spindles - machining of one workpiece) and the embodiment of claim 10 (second machine operator).

Drawings Figs. 2 and 3 are submitted herewith showing in Fig. 2 simultaneous machining of a single workpiece (22) by two spindles (12, 13) and showing in Fig. 3 stocking of the second magazine by a second operator.

Reconsideration and withdrawal of the objection to the drawings are therefore respectfully requested.

Specification

The specification has been amended in the section Brief Description of the Drawings to reflect the new drawing figures.

Paragraph 0018 of the specification has been amended to correct an incorrectly translated term. As apparent from the context, the paragraph deals with the benefits of the tool magazines in regard to the machining operation, i.e., the work performed by the spindles with the aid of the tools (i.e., cutting or chipping). No new matter has been introduced.

In paragraph 0020, extraneous wording has been removed.

Claim Rejections - 35 U.S.C. 112

Claim 3 stand rejected under 35 U.S.C. 112, 2nd paragraph, as being indefinite because it depends from itself. Claim 3 as been corrected.

Reconsideration and withdrawal of the rejection of the claim pursuant to 35 USC 112 are therefore respectfully requested.

Rejection under 35 U.S.C. 102

Claims 1-3 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Solterman* (US 5,971,904).

The examiner sets forth that the prior art reference discloses a tool magazine 21 with tool supports (bars) 31 carrying several tools. The bars 31 are therefore interpreted by the examiner as a tool magazine. The examiner also states that in col. 6, lines 49-53, of the prior art reference the bars 31 and thus the tools within the bars 31 can be exchanged during machining of the workpieces because of the operator interface 22.

In this connection, it should be first pointed out that, in accordance with instant claim 1, during stocking of the **first** tool magazine, the **second** spindle 13 continues to machine the workpiece; during stocking of the **second** tool magazine, the **first** spindle 12 continues to machine the workpiece while the spindle 12 or 13 correlated with the tool magazine 2 or 3 where the tool exchange is to be carried out stands still during stocking of the correlated tool magazine or performs no machining on the workpiece (see last sentence of paragraph 0019; see paragraph 0022, middle part). According to the invention, the commonly used single magazine tool is replaced by several magazines so that each spindle has its own magazine. In this way, when one of the magazines needs restocking with tools, the magazine and the correlated spindle can be stopped but the other magazine and the spindle remain operative, i.e., the spindle can still machine the workpiece and, as needed, can access the correlated magazine for exchanging tools. This is not shown in the cited prior art reference.

The above described features are claimed in more detail in claim 17.

According to the cited prior art reference, the bars 31 with tools are stocked in the tool magazine 21, as disclosed in col. 4, lines 17-22. Accordingly, the bar 31 is inserted by means of the transport element 41 into the main support 30. Insertion of the bars 31 into the supports 30 of the tool magazine 21 is not possible when the tool magazine 21 is moving in order to transport individual tool magazines 31 to their respective transfer positions at the machining stations 7. Stocking of the tool magazine 21 with the tool carriers 31 is only possible when the tool magazine 21 stands still. Even through the machining device is provided with several spindles, there is only one mechanism of supplying tools to the spindles: the circulating tool magazine 21 in the form of a chain with links 30 serves to provide all spindles with the required tools. The chain is divided virtually by programming means 23 into sequential sub-assemblies having a number of bars 31

corresponding to the number of machining stations 7 (see col. 6, lines 26-53). Even though the bars 31 may be designated to supply only a certain spindle with tools, an independent supply operation is not possible: because the tool magazine 21 as a whole must be stopped for inserting or removing the tool bars 31, it is not possible to stock a first "magazine" for a first spindle with tools while the second "magazine" 31 is still available to supply a second spindle with tools so that machining at the second spindle, including tool exchange, can continue.

It would not be possible to perform the method according to the invention by the device of the prior art: as soon as a stocking process (removing old tools and providing new tools) is to be carried out, the chain of the tool magazine 21 into which the tool carriers 31 are inserted must be stopped. When the chain is stopped, a second spindle, during the stocking process of a first "magazine" 31, can no longer access tools in the second "magazine" 31 correlated with the second spindle because the single tool magazine 21 is stopped. Accessing tools in the second "magazine" 31 would be possible only if the chain of the tool magazine 21 were moving. However, since the chain must be stopped during the stocking process, it would not be possible to carry out a tool exchange at the second spindle.

According to the present invention, the spindles 12, 13 each have their own tool magazine 2, 3, respectively. By providing individual tool magazines for each spindle, one tool magazine 2 or 3 can be stopped for stocking while the other tool magazine 3 or 2 can continue to supply tools for exchange at the other spindle.

Therefore, the cited prior art reference cannot anticipate or make obvious the present invention as claimed.

Rejection under 35 U.S.C. 103

Claims 1-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Azema (US 6,077,206)*.

In recapitulating the above, applicant would like to stress again that the present invention is not concerned with stocking a tool magazine while the working spindle machines a workpiece. The method according to the invention is concerned with the double spindle machine tool where a first spindle of a double-spindle machining center

machines a workpiece while having access to its tool magazine and a second spindle during stocking of its tool magazine does not carry out any machining steps. The spindle 12 or 13 that is correlated with the tool magazine 2, 3 being restocked, respectively, stands still.

The cited prior art reference to *Azema* only shows that the tool magazine 500 is stocked or loaded while the spindle 200 carries out a machining step. A double spindle machine tool is not disclosed.

According to the present invention, it is important that the device is a single machine tool provided with two tool spindles. Such a double-spindle machine tool is different from two individual machine tools each having a spindle because, for example, it has a common frame, a common encasement, and a common control. Accordingly, such a two-spindle machine tool is of a compact configuration and is economic with regard to purchase price and operation. In such a unitary machine tool that is not comprised of two individual machines but is a true two-spindle unit, it is not obvious to allow the second spindle to continue to carry out the machining process during loading or stocking of the tool magazine, simply because the machine tool is considered a unit and, as such, is to be serviced as a unit, i.e., a person skilled in the art would expect to restock the machine tool in a single step for both spindles.

This disadvantage is apparent also in the cited U.S. patent 5,944,643. This machine tool has two working spindles 18 but only a single tool magazine 24. When this tool magazine 24 is stocked, both spindles 18 must be stopped because access to the tool magazine 24 during stocking is not possible for the aforementioned reasons. It is well known in the art that in the case of such machine tools, the entire machine has to be shut down in order to be able to stop the tool magazine so that the entire production is shut down during the restocking period.

The present invention has found a different approach in that the spindles have their own magazine and the tool magazines are to be stocked individually so that the spindle whose magazine is not currently restocked is able to continue processing of the workpiece including exchanging tools stored in its tool magazine. This is a novel solution not shown in any of the cited prior art references. The machine tool according to the invention enables

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machining at 50 % capacity during the time of tool restocking while prior art devices lose their entire production capacity during restocking because they must be shut down.

For the reasons mentioned above, the machine tool according to the present invention can be judged only in comparison to machine tools with two spindles.

The invention as claimed is therefore not obvious in view of the prior art reference to *Azema*.


CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned would appreciate a phone call or e-mail from the examiner to discuss appropriate amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on December 14, 2004,


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Encl.: time extension petition (1 sheet); new drawing sheet/s Figs. (2 sheet/s)